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THE LAW OF BALANCED RETURN

There is a striking unanimity among economists that the law of diminishing returns has vitality in the economic theory of the present time. Many principles of explanation raised to the dignity of law by the school of classical economists are undergoing constantly searching analysis, with regard to both their fundamental import and their application to the conditions of twentieth century production and distribution. Nevertheless, there seems to be a consensus of opinion that this law retains an important place both as an abstract principle of deduction and as an effective working hypothesis for interpreting facts. Yet, on the other hand, there is no such unanimity regarding the rigor with which the principle may be applied to modern industry. And this somewhat pragmatic test of the law's present worth is the only test that can now concern us. That it was an effective principle to explain production under the agrarian conditions of early nineteenth century England does not prove, necessarily, that it is equally effective under the highly organized industrial conditions of the twentieth century. That, indeed, the law in the form that it has been passed down to us must seem both inadequate and obsolete would appear from the difficulties experienced in bringing it into accord with modern conditions. Its inadequacy and obsolescence will appear from an analysis of the necessary presuppositions of the traditional form of the law.

These presuppositions are as follows:

1. Economic production results from the coöperation of elements or factors essentially different from each other.
2. The factors and the products may both be reduced to quantitative terms.
3. The proportions of the factors that coöperate in bringing about the product may be varied.
4. The quantities to which both factors and products may be reduced can be related by direct numerical ratios; in other words, the quantities of factors and products are commensurable and may be compared with each other in terms of some quantitative common denominator.

The first of these involves the fact that at least some of the factors which the economist considers essential to production are fundamentally different. It is not the present purpose to discuss whether or not the four well-known elements assumed by the classical economists may be reduced in number. It is sufficient to point out that if reduced to nature and labor, material and man, in the terms of which we are accustomed to describe primitive industry, these two are absolutely and irreducibly different from each other. This difference is always assumed as a postulate by even the most critical students of economic theory and its further criticism would carry us into the range of metaphysics.

The second presupposition stated above must be assumed if the principle of diminishing returns is to be objectified into a law. It involves the fact that nature, labor, capital, and the resulting products can each be reduced to quantitative terms—so much land, so much labor, so much capital, and so much product. Each must be expressed in terms of quantity. It need not be, necessarily, acres, days, dollars, and bushels, but it must be a definite quantity of land acted upon by a definite quantity of labor and a definite quantity of capital and producing a definite quantity of product. Otherwise, there is no law of diminishing returns because there is no common denominator by which different conditions of production may be compared.

The third presupposition involves the fact that the quantity of the separate factors that coöperate in producing a given product may be varied at will. It implies that there is no fixed quantity of natural resource or of labor or of capital that must be used in any given combination. Granted the necessity that economic product can arise only through the coexistence of at least two different factors (our first presupposition) it follows that there is an irreducible minimum for each factor. There must be at least some labor, some of a natural resource; but above this lower limit the quantity of labor and the quantity of the natural resource may be varied at will. In other words, economic production is not dependent on definite proportions of the factors. Or, expressing this in negative terms, an economic product is not analogous to a chemical product which has its composition determined by a definite proportion of the factors.

The fourth presupposition implies that quantities of the factors and of the products may be compared; likewise the products of different combinations of factors. Otherwise the quantities of the

two, factors and product, are incommensurable with each other and cannot, therefore, be related. Thus when we speak of doubling the labor factor we must imply that some quantitative equivalent of labor is just twice as great in the one case as in the other. We imply that the economic value of different labors may be reduced to such quantitative terms that their values may be compared directly with each other in terms of a simple numerical ratio—twice, a half, three times. Similarly, when we say that the product is not twice as great we imply that the two products may be reduced to a common denominator of economic quantity and as such compared. The law of diminishing returns says nothing concerning variations in quality nor measures of intensive value; it is essentially and primarily a one dimensional law, presupposing perfect commensurability of the quantitative equivalents for economic values. This presupposition changes the law of diminishing returns from a regulative principle into one capable of empirical verification according to the logical test of concomitant variation. We can vary the quantity of labor applied to a given piece of land or piece of machinery and note the effect on the quantity of the product. We have to assume that one of the factors remains constant while the other factor or factors vary; but this is no more of an assumption than that taken in the physical sciences where a general principle is tested by a few crucial cases of concomitant variation.

From this summary of the presuppositions upon which the law rests, it is clear that in form, at least, it is a quantitative law. In fact it is one of the very few so-called laws of the social sciences which reflect the quantitative form generally regarded as the ideal of the natural sciences. But beyond this outward form it has been found well nigh impossible to reduce the principle of diminishing returns to quantitative terms. How much of a reduction in product will result from a given change in the quantity of the factors? This and similar questions cannot be answered because of the extreme difficulty in controlling the quantities of the factors throughout a series of experiments. Consequently, there has been no progress in our understanding of it beyond a vague indefinite statement long familiar in the textbooks.

The chief reason for this failure to recognize that the law of diminishing returns is in form quantitative, but incapable of direct empirical verification, is that we associated it with agricultural production. Historically, agricultural production was the

field in which economists worked out the law and it is still the field in which its application, merely as a general principle, is clearest to us all. Teachers and writers on economic subjects are still using it because of the simplicity and ease of illustration. But it is the field where progress beyond the merest qualitative verification is impossible because of the practical difficulty of controlling the conditions under which the law may be put to a practical test. Two pieces of land are never the same; soil, exposure, drainage, susceptibility to insect pests must be different even though the two pieces are adjoining fields. And if the same piece of land is cultivated under varying quantities of labor during successive years there is the uncontrolled and presumably different set of weather conditions. The most that can be said, therefore, is that the increase in the quantity of the product is not proportional to the increase in the quantity of the varying factor, the labor. But if the presuppositions underlying the law are true, it must be susceptible to a more rigorous statement than this. Without for a moment minimizing the importance of agriculture, one must recognize that modern industry includes much that is not agriculture. And the law of diminishing returns, if it is to retain its old-time vitality, either must be held within agriculture and extractive activities as its own restricted field or shown to have a genuine applicability to modern industry.

Many facts connected with present-day manufacture indicate conditions which might be associated with the law of diminishing returns, were it possible to phrase it differently—were it possible to get a clearer idea of the meaning of quantity as it must be applied to the factors in industrial production. The presuppositions of the law require that labor and capital be compared, quantitatively, with each other and with the product under varying combinations. The difficulty is to do this empirically. But this difficulty is not nearly as unsurmountable in modern manufacturing as in agriculture and the other extractive industries. Economists have noted, especially within the last ten or fifteen years, that the economies of large-scale production, particularly when spread over many widely separated plants, have not been realized to anything like the extent that was anticipated. In some notorious instances they were not realized at all, the cost of the product being larger in large-scale than in small-scale production. This suggests the presumption that the law of diminishing returns, heretofore applied to those kinds of production in which a natural

resource is the constant factor and labor and capital the variables (like agriculture and mining), can be applied to manufacture if only varying quantities of the factors of production can be empirically studied in their effects on the quantity of production. To do this the problem then becomes a study of the effect of changes in the quantity of the factors upon the quantity of the product.

In isolating the factors, in order to test the effect on the product of varying their quantity, it is neither necessary nor illuminating to distinguish between that portion of the capital factor that is invested in land and that in structures and equipment. If the manufacturer had a certain amount of money to be invested in "plant account," it would rest merely with his construction engineer to determine how much should be expended in land and how much in structures and machinery. Very commonly a few hundred dollars of unimproved land gives sufficient area to erect a plant costing hundreds of thousands of dollars. Especially is this true if the establishment does not require land in or near a city. As soon as the land is acquired, its original cost is irretrievably merged with the cost of the foundations and the structures, the whole representing a fixed capital investment which, aside from depreciation on the one hand and improvements on the other, remains relatively constant for considerable periods of time. It is, indeed, the most constant factor of production that economic theory can isolate, far more constant than the land of the agriculturalist, which is always subject to differences in soil content and the varying conditions of weather. On the other hand, the labor factor can be subjected to direct and quantitative controls, impossible in the case of agricultural production. For it is certain that the economic value of agricultural labor varies with the seasons. The worth of a day's work at hoeing in early June is distinctly different from the same objective quantity in August—hoeing or anything else. But in manufacturing, on the other hand, the economic value of the same quantity of labor is more nearly constant whenever applied to the same equipment. Similarly, the proportion of economic values of varying quantities of manufacturing labor approximates the ratio of the quantities. One day's labor and two days' labor at a stitching machine are more easily compared with each other and their product than one and two days' labor on a farm.

Reduced, then, to the simplest terms and the terms most nearly

consonant with actual conditions, it appears that the product of a modern manufacturing establishment is the direct result of a relatively constant factor in the form of fixed capital investment and a variable factor in the form of human labor, the whole administered by an intangible economic value called entrepreneur ability—the rôle of which in the present discussion may be omitted for the moment. The immediate problem of the quantitative relations between factors and products in manufacturing—the problem of the application of the law of diminishing returns—is, then, the problem of the effect of variations in the quantity of equipment and the quantity of labor on the quantity of the manufactured goods. To subject this problem to specific empirical tests there would be two mutually related experiments or rather sets of observations. (1) Assume a constant quantity of labor (a constant labor cost); vary the quantity of fixed capital (the capital cost); and note the effect on the quantity of product. (2) Assume a constant quantity of fixed capital (a constant capital cost); vary the quantity of labor (the labor cost); and note the effect on the quantity of product. It is obviously impossible to isolate cases where the conditions may be controlled, as is often possible among the physical sciences; but there are groups of economic phenomena which so nearly approximate those just defined that the conclusions to be drawn from them are at least of tentative value.

The shoe industry affords numerous illustrations of varying costs of fixed capital under a constant of labor costs.¹ The following case is highly instructive. A certain man had had long training in the business. He had accumulated enough money to operate a small factory with rather antiquated and inefficient equipment. In this he was highly successful. Spurred on by his success he built a modern factory to manufacture the same grade of shoes. Indeed, so complete and perfect of its kind was the new factory that it was distinctly a "show establishment" among those making that particular grade of shoe. The output or quantity of product was very much greater than in the previous factory although the same scale of piecework wages prevailed. He failed, losing in a short space of time practically all that he had made

¹ The labor element in the shoe industry is easy to isolate and deal with, as the industry is conducted on a piece work basis now carefully systematized. The scales of payment are approximately equal in different localities for the same grades of labor.

under the previous conditions. He exercised the same entrepreneur ability in both factories. The labor costs per unit of product remained as constant as a set of actual conditions would permit. The fixed capital costs only varied. But in the second case they were so much greater proportionally to the cost of labor that the total cost of the product exceeded the competitive price value determined by other smaller and technically less efficient factories. In brief, the fixed capital cost was too great for that particular line of product.

And the manufacturers of the different grades of shoes illustrate varying quantities of products produced under conditions of varying quantities of capital investment. The highest grades of shoes are "fine turns," ladies' wooden heel "fancies," and gentlemen's fine custom lasts. These industries are confined to the small personally superintended shops of Haverhill, Brooklyn, and Newark. They are the nearest approach to the old-fashioned custom shops where a few dollars worth of tools was all the shoemaker required. At the other extreme is the large capitalistic establishment of the McElwain Company, manufacturing the cheapest kind of shoes in immense quantities. This company has introduced very many economies of large-scale production, but at enormous cost of equipment. It would be as impossible for a Newark shop to make the McElwain shoes economically as it would for a McElwain factory to turn out a Newark shoe. Each is successful in its own line because it has solved the problem of the balance between the labor cost and the fixed capital cost. But the balance is determined by the size of the output, or rather the quantity of product most economically produced. Should the Newark shop introduce the McElwain large-scale efficiency methods in the endeavor to increase the quantity of its product it would turn out so many "seconds" as to first ruin its reputation and then itself. Should the McElwain Company try to reduce its fixed capital expenditure by substituting more labor for costly equipment, either its labor costs would rise higher in proportion, thereby increasing the cost of its product, or else the quantity of its product would be reduced, thereby increasing the pro rata costs of the fixed capital and therefore the costs of the product. In other words, the Haverhill, Brooklyn, and Newark manufacturers (at least those who are permanently successful) have discovered that nice and delicate balance between the ratio of labor and capital costs on the one hand and the quantity of their output on the other. They

have discovered that with small capital costs proportionally to the total value of the product they must adopt small-scale production. And the McElwain Company also has discovered its own proper balance—that with a large proportion of fixed capital costs in the total cost of the shoe they can adopt large-scale production. The manufacturer described in the preceding paragraph, who was successful with a small cheaply equipped inefficient shop but unsuccessful with a large expensively and efficiently constructed shop, had not discovered the proper balance for his particular grade of product—the proper scale of production for the most economical ratio of capital and labor required by his particular grade of shoe—therefore he failed.

The conclusions to be deduced from these observations of the shoe industry are in brief as follows:

1. Given a constant quantity of labor, constant as evidenced by its costs, in the manufacture of a given grade of product, the quantity or cost of the fixed capital to which it is applied affects the quantity of the product that can be economically produced. (Economical production is evidenced by rising or falling costs, and, in the long run, failure or success in the competitive market.)

2. In the production of any given grade of product there is “an exactly right” scale of production; a change in the scale, either increase or decrease, being reflected in a diminution of the quantity of the product—a diminution evidenced by rising costs. (By scale of production is meant the size of the unit combination of labor and capital conducted as a single establishment or unified group of establishments.)

3. If the grade of product demands proportionally a large quantity of capital corresponding to a small quantity of labor (that is, low labor cost), then the “exactly right” scale of production is large. And, conversely, if the grade of product demands proportionally a small quantity of capital to a given quantity of labor (that is, high labor costs), then the “exactly right” scale of production is small.

We turn now to the other set of observations, dealing with cases where the costs of capital remain constant but the quantity or cost of labor varies. A highly instructive series of such cases is afforded by those metal and munition manufacturers who accepted large-scale orders from belligerent governments at the outbreak of the European war. The American manufacturers, especially in the metal industries, were lured into taking foreign government

orders by high prices and the correspondingly liberal expected profits. They were forced to use their existing plants, although in some cases additions were hurried forward even by searchlight. Increases in equipment were not, however, important in the first hectic rush; so that we are dealing with a rather unusual condition of a constant quantity of fixed capital yielding a product under markedly varying quantities of labor. In many cases the labor was doubled, in some cases even trebled, changing from one ten-hour shift to three eight-hour shifts. Labor was increased intensively. More helpers were assigned to each master; there was greater division of labor and elimination of special work. The results were a disappointment to the managers. The product was not increased proportionally. Three shifts did not produce 2.4 times as much as a single ten-hour shift; the increased intensification of labor within the shop did not make a corresponding increase in the quantity of the product.

If the matter were allowed to remain there, the failure of our manufacturers to meet the sudden and very unusual demands put upon them by the war would be attributed to the rôle of the law of diminishing returns in modern industry. But the experiences of the munition and metal manufacturers were different. In some cases, as with the manufacturers of timing devices for shrapnel shells and other materials requiring fine handwork, the disaster which befell the contractors was worse than that of other larger establishments taking contracts for the kind of war material that could be turned out largely by machinery. The little Connecticut or Vermont shop that undertook the handwork subcontract was ruined, whereas the Bethlehem Steel Corporation, the Westinghouse Electric and Remington companies merely made less money than was anticipated. The handwork shops attempted large-scale production by merely increasing the quantity of labor, and disaster overcame them immediately. The establishments already committed to the manufacture of products in which the cost is largely one of fixed capital, plants already large-scale in comparison with the others, were able to increase yet further the scale of operations without serious loss. And it is notable that the particular steel company which suffered the largest relative curtailment of anticipated profits, the Crucible Steel Company, has, more than any other of the large steel companies, a considerable labor element in the cost of its product.

The conclusions to be drawn from these unusual cases of war

manufacturers are similar to those outlined before as applicable to the shoe industry, only here there are varying quantities and costs of labor with a relatively constant investment of capital.

1. Given a constant quantity of fixed capital, varying quantities of labor affect the quantity of the product that can be economically produced. (Economical production is indicated by rising and falling costs of the product—the outward evidence of rising or falling costs being the failure or the success in the competitive market.)

2. There is reached, easily, a point of excessive costs of production as the proportion of labor is increased with respect to a given quantity of fixed capital.

3. If the grade of product demands proportionally a small quantity of labor to a given quantity of capital (that is, low labor costs), then the most profitable scale of production is relatively large. Conversely, if the product is such as to demand a large quantity of labor with respect to a given quantity of capital (that is, high labor costs), then the most profitable scale of production is relatively small.

These conclusions are identical with those reached from using data drawn from the shoe industry. The first two of them may be passed over, for the moment, as representing merely the consequences that would follow were some form of the law of diminishing returns applicable to manufacturing businesses. On the extent to which this is true it is not the present purpose to dwell. But the third conclusion, alike under both conditions of varying capital investment and varying applications of labor, is of importance in throwing a new light on the conditions of production in manufacturing businesses.

It appears that when the quantity of labor to be applied to a given constant of fixed capital is varied, different types of industry respond differently to the changes. If the industry manufactures a product in which the labor element is large, the quantity of that product cannot be increased by increasing the quantity of labor, except at a very large increase in the cost of production. If, on the other hand, the product is one in which fixed capital is far and above the larger element in the final cost, then a sudden increase in the quantity of labor working upon the capital invested will not so seriously affect the cost of the product.

This result, deduced from a study of data drawn from the shoe and the war materials industries, is not a mere coincidence. Both

the unreflective business man and the economist observing present-day industry have long felt that somehow there must be some general principle underlying the apparent confusion in our observations of large and small-scale production. The practical business man, with what he calls "horse-sense" discriminates among manufacturing businesses according to differences in the quantity of labor that goes to make up the product. He says, "If you have little capital, go into a business with a good deal of handwork." At first sight the truth of this bald, uncritical statement would appear to be based merely on the assumption that such businesses are the only ones available to limited capital. Yet if this negative reason were all there was to this advice then the man with little capital would be eliminated by the competition of larger capitalistic organizations. But, in truth, the practical business man acknowledges in this simple aphorism of the street that the man with little capital survives in those businesses where labor predominates in the cost of production, whereas he cannot survive with his small plant in those industries in which machinery predominates in the production costs. This is another way of saying that sufficient special economies to enable the producer to sell in a free competitive market can be attained in a small sized shop if labor predominates in the cost of production, whereas if the labor costs are relatively small only the shop capable of manufacturing large quantities of the product can survive.

And this rule of thumb of the practical business man is in strict accord with the conclusions previously drawn from the shoe and war munitions business. It is, moreover, frequently tacitly assumed in the discussions of economic theory employing the concept of the law of diminishing returns in its classic form. The economists admit that the law does not operate at every point of intensive production, not even in its classic field of agriculture. It is quite probable, for illustration, that within ranges of very meager cultivation two days' labor might produce more than twice as much product as one day's labor. If a man spent one day plowing a plot of land and then carelessly planting it, there is very strong probability that it would not produce half the product it would produce if he spent two days' labor in plowing, harrowing, and carefully planting. Obviously, the law of diminishing returns begins to operate only after some labor and some capital have been expended on land beyond the irreducible minimum. Obviously, there is a point in agricultural production up to which the

returns increase more than in proportion to the increases in labor and capital. Beyond this point the returns decrease. There must, therefore, be a point where increasing returns cease and diminishing returns begin, a point of perfect equilibrium. From this point either a decrease or an increase of labor or capital results in a decline in the relative quantity of the products.

A study of the position of this point of equilibrium in various forms of industry has never seemed significant to the student of economic theory for two very good reasons. In the first place, as has been said, our minds have become accustomed, both from the literature of the subject and the ease of exposition, to deal with the law of diminishing returns as essentially an agriculture phenomenon or at most confined to extractive industries. The comparison of its operation in agriculture with its possible working in other industries has seemed, therefore, neither pertinent nor of practical moment. And, again, the conditions under which labor and capital are applied to land vary so with locality, soil, and custom that any single practical demonstration of this point would have little or no significance beyond the isolated case. But if the law of diminishing returns is recognized throughout industry, then the understanding and comparison, in different fields, of this point of equilibrium becomes one of the most significant of strictly theoretical economic problems.

It is this comparison which leads to the conclusion, drawn from various industries, that there is a point of maximum productivity as the quantity of labor and of capital is increased, but that this point varies in position according to the relative proportions of capital and labor represented in the final product. If the product is fine shoes, representing a large ratio of labor to invested capital, the point is reached in a relatively small scale of production; if it is inexpensive low-grade men's shoes, it is reached only under conditions of very large-scale production. Clearly the position of this point at which increasing returns cease and decreasing returns begin, a point found somewhere in every industry, varies according to the relative proportion of labor and capital represented by the final product. This connection between the two can be stated in the form of a new law; or, better, a general principle approaching the rigor of a law as near as the flexibility of economic phenomena permits. It is this: *the ratio between the quantitative values of labor and fixed capital in any unit or product determines the point at which increase in the scale of total*

production ceases to be economical; i.e., it determines the point of maximum productivity beyond which further investments of fixed capital and further increments of labor cease to yield the same proportionate quantity of product. This may be called the law of maximum balanced return, or simply the law of balanced return. It represents a more abstract statement of the third conclusion previously drawn from the shoe and the munitions industries. The rest of this article is devoted to its further exposition.

This principle can be expressed in various forms. It means merely that there is a direct connection between the scale of economical production, the point of equilibrium when increasing returns ceases and diminishing returns begins, and the proportion of labor and machinery that goes into the manufacture of an article. Imagine the cost of producing a certain pair of shoes to be \$1.50, of which 50 cents represents the interest, depreciation, and obsolescence of all the machinery, factory, plant and power system, together with the rentals of hired equipment, that can be borne by this one pair of shoes. Imagine that \$1 represents the wages of labor and superintendence. We may assume, therefore a ratio of one to two between capital and labor costs for this particular article. Imagine another pair of shoes of which the total cost is also \$1.50 but of which the capital costs are 75 cents and the labor costs 75 cents; obviously the ratio here is one to one. Now, if the principle outlined above is correct, it will follow that these two ratios give the key to the scale at which production may be carried on for the two classes of shoes. This scale will be larger for the second class than for the first. One would like, following the ideal of quantity which all general principles strive for, to say the scale will be twice as great. But one must freely admit that the rigor of quantitative exactness is a remote ideal for economic theory. The principle is at least true that a direct connection exists between the ratio of capital and labor costs on the one hand, and the scale of production permitting the lowest costs, on the other hand. To what extent their connection may be reduced to rigid quantitative terms is, at best, a matter of empirical evidence.

Numerous instances having to do with large and small-scale production seem to justify this principle in our actual experience. The most significant revelation of the history of industrial consolidation that followed the depression of the middle nineties was that the anticipated economies of large-scale production were not

forthcoming. In certain industries, such as the steel industry, the divergence between theory and practice was not as marked as in others. But, nevertheless, in spite of exceptions, the fact remains that the industrial consolidations based on the fundamental presumption of the economies of large-scale production were a profound disappointment to the student of economics and the practical business man alike. And the error in the judgment of both was the same, the unintelligence and limitations of human labor. Its economic efficiency is not increased by mere quantitative additions. On the contrary it is decreased. Consequently, an increase in the quantity of capital did not produce a corresponding increase in the quantity of the product because the productivity of the labor element could not be increased by mere quantitative accretions. A sudden increase in the real quantity of capital and the apparent quantity of labor carried the scale of production in the vast majority of industrial consolidations beyond the point of balance, where the increasing returns ceased and diminishing returns began. There is this fundamental contrast between labor and capital, a failure to realize which blinded the promoters of the industrial consolidations. In those types of industry where the human element is of small importance in the final product an increase in the quantity of labor applicable to capital could be made to keep pace with an increase in the capital even up to a point of an extremely large scale of production. This is now true of the steel industry. The fixed capital has become enormously large, but less and less does labor play a part in the final product. The very purpose behind the increase in fixed capital has been the substitution of mechanistic production for human. And as the ratio between the quantity of capital applicable to each unit of labor has increased, the scale upon which production can occur economically has increased correspondingly. In fact, so far has the successful substitution of machinery for labor been carried in the steel business that it affords to the minds of many students the best example in modern industry of economical large-scale production. It has been reported by four entrepreneur steelmakers, of wide experience and acute understanding, that no thoroughly economical establishment for the manufacture of steel and its simpler products can be built short of ten millions of dollars. Coupled with this large scale of production is the fact that in the value of the final product, the pro rata share of the fixed capital is enormous, while the labor costs are exceedingly small. That

the labor costs are proportionately the smallest of any industry would be difficult to prove, but it is a matter of personal judgment.

Another rather striking example is shown by the increasing scale of production for different forms of tobacco products. When the American Tobacco Company was organized it succeeded immediately in securing a monopoly—upwards of at least 90 per cent of the production—of machine-made cigarettes. This is the branch of the tobacco business in which production is conducted on the largest scale. It requires complicated and expensive automatic machinery, but at the same time a minimum of hand labor. And the old American Tobacco Company easily drove out the small competitors in this line through superior factory equipment, the result of liberal capital expenditures. Having secured a monopoly in this single form of product the company made it doubly sure by acquiring the patents covering the essential machinery. But the branch of the tobacco industry which the American Tobacco Company succeeded in neither monopolizing nor even gaining a dominant foothold in, in spite of uninterrupted efforts for upwards of twenty years and a large investment of capital, was the manufacture of cigars. This is the very branch of the industry in which hand labor is everything and machinery nothing. A skilful entrepreneur with a few thousand dollars of capital, employing a few cigarmakers, buying his materials carefully, and personally supervising the work can produce a high-grade cigar actually cheaper than can a large establishment having unlimited capital at its disposal. In other words, the point of largest economy of production is reached very soon in the high-grade cigar industry, very late in the machine-made cigarette industry. But the production cost of the cigarette is mostly the cost of the fixed capital, whereas in the cigar this cost is almost negligible. On the other hand, the labor cost of the cigarette is small, of the cigar very large.

All this is mere illustration of the principle, before abstractly stated in the italics, that the point at which the law of diminishing returns begins to operate as the scale of production is increased is determined by the ratio between the labor costs and the capital costs. Those industries which produce articles involving artistic handicraft or high technical skill must inevitably operate under conditions of small-scale production, because the point at which increasing returns end and diminishing returns

begin occurs early. On the other hand, if the article does not require the intelligent attention of skilled labor, the operation of a law of diminishing returns may be postponed to the extent that capital investment in appliances may be substituted for skilled labor, that is, the cost of fixed capital may replace the cost of labor in the finished product.

Little has been said thus far concerning the significance of entrepreneur ability as a condition determining the quantity of the product. This omission was intentional because the classic statement of the law of diminishing returns passes over this matter entirely and it would have been confusing to assume the question. Yet no one aspect of the traditional statement of the law shows its obsolescence more clearly. Probably when the law was first formulated one could presume a certain uniformity of entrepreneur ability throughout all agricultural and extractive industries. Such a situation might have been true once (purely a historical question), but it certainly is not true now. Yet that is exactly what the law of diminishing returns presumes; in truth, were such a presupposition not so contrary to fact it would have been added as a fifth presupposition to the four outlined at the opening of this discussion. To presume with certainty that an increase in the quantities of capital and labor added to land does not bring about a proportionate increase in the quantity of the product, presumes that the same or inferior entrepreneur ability is exercised with the increased expenditures of capital and labor. But in actual practice a constant of entrepreneur ability is the most difficult thing to presume. Conceivably a man might cultivate a plot of land expending on it one unit of capital and one of labor. The succeeding year he might cultivate the same plot doubling both capital and labor and at the same time using greater knowledge gleaned from the previous experience. Almost surely his product will be more than twice as great, and conceivably might be three or four times as great. Similarly, two adjacent back-yard gardens, tilled with the same amount of capital expenditure and number of hours of labor, produce such different quantities of product that one is sheer economic waste and the other constitutes a valuable contribution to national wealth. In brief, the statement of the law of diminishing returns, as it has been formulated in the textbooks of economics, omits altogether that one element which the actual conditions of modern industry is bringing more and more into paramount importance—entrepreneur ability.

The entrepreneur function has a very important rôle in what we have here called the law of balanced returns. Clearly the most important question in all businesses, what one might call the key to all questions of industrial policy, is this very question of the scale of production likely to bring about the maximum efficiency. By maximum efficiency to the business man is meant the conditions likely to produce the largest quantity of product at the lowest cost consistent with the probable market. This is merely another way of phrasing this point of balance or equilibrium between increasing and decreasing returns. To gauge it aright is the paramount question of the entrepreneur function in all business, the question which boards of directors and ultimate managers must determine. The lesser managerial functions may, in the majority of cases, be delegated. This cannot. A mistake here in determining the scale of production is so vital to the wise conduct of the business that no amount of lesser economies and minor shop palliatives can overcome the error. On the other hand, the business may absorb a host of wastes and shop inefficiencies if only the entrepreneur ability of the management is sufficient to reason out the scale of production which approximates, in practice, the theoretical balance between increasing and decreasing returns. The key to this scale is, as the body of this article seeks to show, the ratio between the labor cost and the capital cost represented in the final product.

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